



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2018-1034; Product Identifier 2018-NE-38-AD]**

**RIN 2120-AA64**

**Airworthiness Directives; Rolls-Royce plc Turbopan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** We propose to supersede airworthiness directive (AD) 2008-22-24 which applies to certain Rolls-Royce plc (RR) RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 model turbopan engines. AD 2008-22-24 requires initial and repetitive ultrasonic inspections of installed low-pressure compressor (LPC) fan blade roots on-wing and during overhaul, and relubrication according to accumulated life cycles. Since we issued AD 2008-22-24, RR determined the need to expand the inspections to engines operating under additional flight profiles and to extend the inspection intervals for certain affected engines. This proposed AD would require initial and repetitive inspections to detect cracks on the installed LPC fan blade roots on-wing or at engine overhaul. We are proposing this AD to address the unsafe condition on these products.

**DATES:** We must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.

- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact, Rolls-Royce plc, Corporate Communications, P.O. Box 31, Derby, England, DE24 8BJ; phone: 011-44-1332-242424; fax: 011-44-1332-249936; email: [http://www.rolls-royce.com/contact/civil\\_team.jsp](http://www.rolls-royce.com/contact/civil_team.jsp); Internet: <https://www.aeromanager.com>. You may view this service information at the FAA, Engine & Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759.

### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2018-1034; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, the mandatory continuing airworthiness information, the regulatory evaluation, any comments received, and other information. The street address for Docket Operations (phone: 800-647-5527) is listed above. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Matthew Smith, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7735; fax: 781-238-7199; email: [mathew.c.smith@faa.gov](mailto:mathew.c.smith@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA-2018-1034; Product Identifier 2018-NE-38-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this NPRM. We will consider all comments received by the closing date and may amend this NPRM because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

### **Discussion**

We issued AD 2008-22-24, Amendment 39-15721 (73 FR 65511, November 4, 2008), (“AD 2008-22-24”), for certain RR RB211-535E4-37, RB211-535E4-B-37, and RB211-535E4-B-75 model turbofan engines. AD 2008-22-24 requires initial and repetitive ultrasonic inspections of installed LPC fan blade roots on-wing and during overhaul, and relubrication according to accumulated life cycles. AD 2008-22-24 resulted from the discovery of cracks in LPC fan blade roots. We issued AD 2008-22-24 to detect cracks in LPC fan blade roots, which if not detected, could lead to uncontained multiple fan blade failure and damage to the airplane.

### **Actions Since AD 2008-22-24 Was Issued**

Since we issued AD 2008-22-24, it was reported that some engines were operated outside the profiles initially specified, and RR introduced new flight profiles to mitigate the risk of overflying the recommended flight profiles. Consequently, RR extended the

inspection intervals for engines operating within RB211-535E4-B-37 flight profiles C, D and E. Additionally, RR introduced inspection instructions for engines operating within RB211-535E4-C-37 flight profile F and RB211-535E4-37 flight profile G. Also since we issued AD 2008-22-24, the European Union Aviation Safety Agency (EASA) has issued AD 2018-0202R1, dated September 25, 2018, which requires initial and repetitive ultrasonic inspections of installed LPC fan blade roots.

### **Related Service Information under 1 CFR Part 51**

We reviewed Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) No. RB.211-72-AC879, Revision 9, dated April 23, 2018 and Rolls-Royce Service Bulletin (SB) RB.211-72-C946, Revision 4, dated June 22, 2010. Rolls-Royce NMSB RB.211-72-AC879 describes procedures for performing inspections of high cyclic life LPC fan blade roots on-wing or at overhaul, and re-lubrication of the LPC fan blade roots during overhaul. Rolls-Royce SB RB.211-72-C946 introduces a revised LPC fan blade featuring a redefined dry film lubricant application. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

### **FAA's Determination**

We are proposing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

### **Proposed AD Requirements**

This proposed AD would retain the requirements of AD 2008-22-24. The proposed AD would extend these requirements to engines operating under additional flight profiles and add the RB211-535E4-C-37 model turbofan engines to the applicability of this AD. This proposed AD would require initial and repetitive inspections of LPC fan blade roots on-wing or at engine overhaul, and replacement of

blades that exceed the criteria in the Rolls-Royce Alert NMSB RB211-72-AC879, Revision 9, dated April 23, 2018.

### **Costs of Compliance**

We estimate that this proposed AD affects 512 engines installed on airplanes of U.S. registry.

We estimate the following costs to comply with this proposed AD:

#### **Estimated costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Inspection of LPC fan blade set	7 workhours X \$85 per hour = \$595	\$0	\$595	\$304,640

We estimate the following costs to do any necessary replacements that would be required based on the results of the proposed inspection. We have no way of determining the number of aircraft that might need these replacements:

#### **On-condition costs**

<b>Action</b>	<b>Labor cost</b>	<b>Parts cost</b>	<b>Cost per product</b>
Replacement of LPC fan blade	4 work-hours X \$85 per hour = \$340	\$77,916	\$78,256

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by

prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to engines, propellers, and associated appliances to the Manager, Engine and Propeller Standards Branch, Policy and Innovation Division.

### **Regulatory Findings**

We have determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that the proposed regulation:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by removing airworthiness directive (AD) 2008-22-24, Amendment 39-15721 (73 FR 65511, November 4, 2008), and adding the following new AD:

**Rolls-Royce plc:** Docket No. FAA-2018-1034; Product Identifier 2018-NE-38-AD.

#### **(a) Comments Due Date**

The FAA must receive comments on this AD action by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

This AD replaces AD 2008-22-24, Amendment 39-15721 (73 FR 65511, November 4, 2008).

#### **(c) Applicability**

This AD applies to Rolls-Royce plc (RR) RB211-535E4-37, RB211-535E4-B-37, RB211-535E4-C-37, and RB-211-535E4-B-75 model turbofan engines except those with fan blades that have all incorporated Rolls-Royce Service Bulletin (SB) RB.211-72-C946, Revision 4, dated June 22, 2010 (or any earlier revision).

#### **(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section.

**(e) Unsafe Condition**

This AD was prompted by small cracks found in the low-pressure compressor (LPC) fan blade roots on the conclave root flank during an engine overhaul. We are issuing this AD to detect cracks in the LPC fan blade roots. The unsafe condition, if not addressed, could result in uncontained LPC fan blade release, damage to the engine, and damage to the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.



**(g) Required Actions**

(1) For engine models being used in the flight profiles indicated in Table 1 to paragraph (g)(1) of this AD, perform initial and repetitive ultrasonic inspections of the affected fan blades in accordance with the Accomplishment Instructions, paragraphs 3.A., 3.B., and 3.C., of Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) RB211-72-AC879, Revision 9, dated April 23, 2018, as follows:

(i) Perform an initial ultrasonic root or surface wave inspection of each LPC fan blade before exceeding the inspection threshold as indicated in Table 1 to paragraph (g)(1) of this AD, or within 30 days after the effective date of this AD, whichever occurs later.

(ii) Thereafter, perform a repetitive ultrasonic root or surface wave inspection of each LPC fan blade at intervals not to exceed engine flight cycles (EFCs) since the previous inspection using the applicable EFCs specified in Table 1 to paragraph (g)(1) of this AD.

**Table 1 to Paragraph (g)(1) – Flight Profile Inspection Intervals**

<b>Model</b>	<b>Flight Profile</b>	<b>Initial Inspection Threshold, EFCs Since New</b>	<b>Reinspection Interval; Root Probe Method</b>	<b>Reinspection Interval; Surface Wave Probe Method</b>
535 E4-37	B and G	15,000 EFCs	850 EFCs	700 EFCs
535E4-C-37	F	15,000 EFCs	850 EFCs	700 EFCs
535E4-B-37	E and C	20,000 EFCs	1,200 EFCs	1,000 EFCs
535E4-B-75	All	20,000 EFCs	1,200 EFCs	1,000 EFCs
535E4-37	A	20,000 EFCs	1,400 EFCs	1,150 EFCs
535E4-B-37	D	20,000 EFCs	1,500 EFCs	1,200 EFCs

(2) For engine models that, after the effective date of this AD, change flight profiles, inspect the affected fan blades before exceeding the initial threshold of the new

flight profile or reinspection interval, as applicable, or within 200 EFCs after changing flight profiles, whichever occurs later, without exceeding the previous flight profile initial inspection threshold or reinspection interval.

(3) If, during any inspection required by paragraph (g)(1) or (2) of this AD, any crack is found in the affected fan blades that exceeds the criteria in the Accomplishment Instructions, paragraphs 3.A., 3.B., or 3.C., of Rolls-Royce Alert NMSB RB211-72-AC879, Revision 9, dated April 23, 2018, before the next flight, replace the LPC fan blade with a LPC fan blade eligible for installation.

**(h) Optional Terminating Action**

Modification of any RR RB211-535E4-37, RB211-535E4-B-37, RB211-535E4-C-37, and RB-211-535E4-B-75 model turbofan engine in accordance with Rolls-Royce SB RB.211-72-C946, Revision 4, dated June 22, 2010, constitutes terminating action to this AD.

**(i) Credit for Previous Actions**

Any initial ultrasonic inspection accomplished before the effective date of this AD that uses Rolls-Royce NMSB No. RB.211-72-C879, Revision 8, dated November 18, 2015, or earlier versions, meets the requirement of the initial inspection, as applicable. Any repetitive ultrasonic inspection accomplished before the effective date of this AD that uses RR NMSB No. RB.211-72-C879, Revision 8, dated November 18, 2015, or earlier versions, meets the requirement of that single repetitive inspection, as applicable. Further repetitive inspections, as mandated by paragraph (g) of this AD, are still required.

**(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ECO

Branch, send it to the attention of the person identified in paragraph (k)(1) of this AD.

You may email your request to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(k) Related Information**

(1) For more information about this AD, contact Matthew Smith, Aerospace Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: 781-238-7735; fax: 781-238-7199; email: matthew.c.smith@faa.gov.

(2) Refer to European Union Aviation Safety Agency (EASA) AD 2018-0202R1, dated September 25, 2018, for more information. You may examine the EASA AD in the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating it in Docket No. FAA-2018-1034.

(3) For RR service information identified in this AD, contact Rolls-Royce plc, PO Box 31, Derby, England, DE248BJ; telephone: 011-44-1332-242424; fax: 011-44-1332-249936. You may view this referenced service information at the FAA, Engine & Propeller Standards Branch, 1200 District Avenue, Burlington, MA, 01803. For information on the availability of this material at the FAA, call 781-238-7759.

Issued in Burlington, Massachusetts, on May 13, 2019.

Robert J. Ganley,  
Manager, Engine & Propeller Standards Branch,  
Aircraft Certification Service.

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